CLAIM AMENDMENTS

IN THE CLAIMS

This listing of the claims will replace all prior versions, and listing, of claims in the application or previous response to office action:

1. (Previously Presented) A method for controlling a valve with a valve actuating device, which is provided in the form of a piezo actuator, with a valve element, a valve body and a valve seat, the method comprising the steps of:

- moving the valve element at a predeterminable point in time from a position in contact with the valve seat into a predetermined position away from the valve seat by a discharging process of the piezo actuator,
- dividing the discharging process into a first discharging duration, during which a predetermined first amount of electrical energy is discharged from the piezo actuator, a subsequent holding time duration, during which the piezo actuator is not controlled, and a subsequent second discharging duration, during which a predetermined second amount of electrical energy is discharged from the piezo actuator, and
- dependent on the waveform of a voltage at the piezo actuator or a current through the piezo actuator which is characteristic of the oscillation behavior of the piezo actuator during the holding time duration, adapting the holding time duration and/or the first discharging duration in order to ensure precise control of the valve.

2. (Previously Presented) A method for controlling a valve with a valve actuating device, which is provided in the form of a piezo actuator, with a valve element, a valve body and a valve seat, the method comprising the steps of:

- moving the valve element at a predeterminable point in time from a predetermined position away from the valve seat into the valve seat by a charging process of the piezo actuator,
- dividing the charging process into a first charging duration, during which a predetermined first amount of electrical energy is fed to the piezo actuator, a subsequent holding time duration, during which the piezo actuator is not controlled, and a subsequent second charging duration, during which a predetermined second amount of electrical energy is fed to the piezo actuator, and
- dependent on the waveform of a voltage at the piezo actuator or a current through the piezo actuator which is characteristic of the oscillation behavior of the piezo actuator during the holding time duration, adapting the holding time duration and/or the first charging duration in order to ensure precise control of the valve.

3. (Previously Presented) A method according to claim 1,

wherein the holding time duration and/or the first discharging duration or the first charging duration is/are adapted dependent on the amplitude and/or the period of the waveform of the variable which is characteristic of the oscillation behavior of the piezo actuator during the holding time duration.

4. (Previously Presented) A method according to claim 3,

wherein the holding time duration is adapted dependent on the period of the waveform of the variable which is characteristic of the oscillation behavior of the piezo actuator during the holding time duration.

5. (Previously Presented) A method according to claim 3,

wherein the first discharging duration or the first charging duration is adapted dependent on the amplitude of the waveform of the variable which is characteristic of the oscillation behavior of the piezo actuator during the holding time duration.

6. (Previously Presented) A method according to claim 2,

wherein the sum of the first charging duration and the holding time duration is limited to a maximum value, which ensures that the valve element is still in contact with the valve seat.

7. (Previously Presented) A method according to claim 1,

wherein the valve is part of a pump/nozzle device with

- a pump, which has a piston and a working space, and
- a control unit, which comprises an outlet duct that is connected hydraulically to the working space, the piezo actuator that forms a valve actuating device, and the valve, whereby the valve comprises a valve element, a valve body, a valve seat and an auxiliary control chamber which is disconnected hydraulically from the outlet duct when the valve element is in contact with the valve seat and which otherwise is connected hydraulically to the outlet duct.

8. (Previously Presented) A method according to claim 7,

wherein the first discharging duration is limited to a minimum value, which ensures that the nozzle needle closes the nozzle.

9. (Previously Presented) Method according to claim 2,

wherein the holding time duration and/or the first discharging duration or the first charging duration is/are adapted dependent on the amplitude and/or the period of the waveform of the variable which is characteristic of the oscillation behavior of the piezo actuator during the holding time duration.

10. (Previously Presented) A method according to claim 9,

wherein the holding time duration is adapted dependent on the period of the waveform of the variable which is characteristic of the oscillation behavior of the piezo actuator during the holding time duration.

11. (Previously Presented) A method according to claim 9,

wherein the first discharging duration or the first charging duration is adapted dependent on the amplitude of the waveform of the variable which is characteristic of the oscillation behavior of the piezo actuator during the holding time duration.

12. (Previously Presented) A method according to claim 2,

wherein the valve is part of a pump/nozzle device with

- a pump, which has a piston and a working space, and
- a control unit, which comprises an outlet duct that is connected hydraulically to the working space, the piezo actuator that forms a valve actuating device, and the valve, whereby the valve comprises a valve element, a valve body, a valve seat and an auxiliary control chamber which is disconnected hydraulically from the outlet duct when the valve element is in contact with the valve seat and which otherwise is connected hydraulically to the outlet duct.

13. (Previously Presented) A method according to claim 12,

wherein the first discharging duration is limited to a minimum value, which ensures that the nozzle needle closes the nozzle.

14. (Previously Presented) An arrangement for controlling a valve with a valve actuating device, which is provided in the form of a piezo actuator, with a valve element, a valve body and a valve seat, comprising:

- means for moving the valve element at a predeterminable point in time from a predetermined position away from the valve seat into the valve seat by a charging process of the piezo actuator,
- means for dividing the charging process into a first charging duration, during which a predetermined first amount of electrical energy is fed to the piezo actuator, a subsequent holding time duration, during which the piezo actuator is not controlled, and a subsequent second charging duration, during which a predetermined second amount of electrical energy is fed to the piezo actuator, and
- dependent on the waveform of a voltage at the piezo actuator or a current through the piezo actuator which is characteristic of the oscillation behavior of the piezo actuator during the holding time duration, means for adapting the holding time duration and/or the first charging duration in order to ensure precise control of the valve.

15. (Previously Presented) An arrangement according to claim 14,

wherein the holding time duration and/or the first discharging duration or the first charging duration is/are adapted dependent on the amplitude and/or the period of the waveform of the variable which is characteristic of the oscillation behavior of the piezo actuator during the holding time duration.

16. (Previously Presented) An arrangement according to claim 15,

wherein the holding time duration is adapted dependent on the period of the waveform of the variable which is characteristic of the oscillation behavior of the piezo actuator during the holding time duration.

17. (Previously Presented) An arrangement according to claim 15,

wherein the first discharging duration or the first charging duration is adapted dependent on the amplitude of the waveform of the variable which is characteristic of the oscillation behavior of the piezo actuator during the holding time duration.

18. (Previously Presented) An arrangement according to claim 14,

wherein the sum of the first charging duration and the holding time duration is limited to a maximum value, which ensures that the valve element is still in contact with the valve seat.

19. (Previously Presented) An arrangement according to claim 14,

wherein the valve is part of a pump/nozzle device comprising

- a pump, which has a piston and a working space, and
- a control unit, which comprises an outlet duct that is connected hydraulically to the working space, the piezo actuator that forms a valve actuating device, and the valve, whereby the valve comprises a valve element, a valve body, a valve seat and an auxiliary control chamber which is disconnected hydraulically from the outlet duct when the valve element is in contact with the valve seat and which otherwise is connected hydraulically to the outlet duct.

20. (Previously Presented) An arrangement according to claim 19,

wherein the first discharging duration is limited to a minimum value, which ensures that the nozzle needle closes the nozzle.